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23416 7590 01/25/2007 CONNOLLY BOVE LODGE & HUTZ, LLP P O BOX 2207 WILMINGTON, DE 19899			EXAMINER KUMAR, VINOD	
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SHORTENED STATUTORY PERIOD OF RESPONSE		MAIL DATE	DELIVERY MODE	
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Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary	Application No. 10/523,362	Applicant(s) CHARDONNENS ET AL.	
	Examiner Vinod Kumar	Art Unit 1638	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 03 November 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1,5,8-11,13,15,18,19,21,25,29,32,34,41,45,47 and 49 is/are pending in the application.
- 4a) Of the above claim(s) 21,25,34,41 and 45 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1,5,8-11,13,15,18,19,29,32,47 and 49 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 07 February 2005 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date <u>02/10/2006</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Election/Restrictions

1. Applicant's election with traverse of Group I, claims 1, 5, 8-11, 13, 15, 18-19, 29, 32, 47 and 49 and SEQ ID NO: 3 in the paper filed on November 3, 2006 is acknowledged.

Applicants argue that the object of the present application relates to Oxidoreductase Stress-Related Proteins (ORSRP) and their application in modulating tolerance and resistance to environmental stress in transgenic plants. Applicants further argue that the general inventive concept of the present application can be briefly summarized as relating to a nucleic acid encoding a glutaredoxin or thioredoxin protein and use thereof in modulating tolerance and resistance to environmental stress of a plant by manipulating the expression of such a nucleic acid. Applicants further argue that Gupta et al. and Foyer et al. do not teach or suggest a heat stable glutaredoxin or thioredoxin protein can modulate tolerance and/or resistance to environmental stress in a plant (response, page 5, line 21 through line 5 of page 6).

Applicants arguments filed on November 3, 2006 have been fully considered but were not found persuasive. The recitations "homologs" in claims 5, 32, 47 and "parts thereof" in claims 18, 19 and 49 read on any oxidoreductase stress-related protein. Accordingly, any "oxidoreductase stress-related protein" is the technical feature that links inventions I-XXXIV together, which does not have contribution over the prior art teachings of Gupta et al. and Foyer et al. Furthermore, it is important to note that different nucleotide sequences and amino acid sequences are structurally distinct

chemical compounds and are unrelated to one another. These sequences are thus deemed to normally constitute different inventive concepts.

Claims 1, 5, 8-11, 13, 15, 18, 19, 29, 32, 47, and 49 in conjunction with the elected SEQ ID NO: 3 are examined in this Office action. Accordingly, claims 21, 25, 34, 45 and SEQ ID NOs: 1, 5, 7, 9, 11, 13, 15-24, 25, 27, 29, 31, 33, 35, 37, 39, 41, 43-45, 47 and 49-50 are withdrawn from further consideration by the examiner, 37 CFR 1.142(b), as being drawn to a non-elected invention. Non-elected subject matter must be removed from the elected claims. Cancellation of non-elected SEQ ID NOs is also acknowledged. This restriction is made FINAL.

Applicant is reminded that upon the cancellation of claims to a non-elected invention, the inventorship must be amended in compliance with 37 CFR 1.48(b) if one or more of the currently named inventors is no longer an inventor of at least one claim remaining in the application. Any amendment of inventorship must be accompanied by a request under 37 CFR 1.48(b) and by the fee required under 37 CFR 1.17(i).

Information Disclosure Statement

2. An initialed and dated copy of Applicant's IDS form 1449 filed on February 10, 2006 is attached to the instant Office action.

Priority

3. Acknowledgment is made of Applicant's claim for foreign priority under 35 U.S.C. 119(a)-(d). The certified copy of Application No. EPO 02017671.5, filed 08/07/02 has been received.

Specification

The disclosure is objected to because of the following informalities:

4. Page 50, Example 1, 1st and 3rd line from the bottom of the page; Page 51, lines 2-3, 17; Page 58, lines 8-9, 13-16, 21-22, 24, 27, 28; Page 59, lines 3-5 have sequences which must be identified by their sequence identifiers in brief description to drawings as required by 37 CFR 1.821.

Figures 3-4, 6-7, 9-10 and 11-12 have sequences which must be identified by their sequence identifier in brief description to drawings as required by 37 CFR 1.821.

If the sequences appearing in the specification do not have sequence ID numbers assigned to them, then an amendment to the sequence listing will be required as well. There must not be any new matter submitted, therefore it is important to be careful to include only the sequences that are already disclosed in the current specification. Failure to correct the deficiency will be held a non-responsive to this Office action.

5. Brief description (legends) to drawings must identify all the labels in Figures 1-2, 5, 8 and 11.

6. Page 63, Example 5, line 25 contains an incomplete citation. Full bibliographic information of the cited reference must be provided.

Appropriate corrections are required.

Claim Objections

7. Claims 1, 5, 18, 19, 29, 32, 47 and 49 are objected to because of the following informalities:

In claim 1, replace "corresponding non-transformed wild type plant cell" with --non-transformed wild type plant cell lacking said ORSRP coding nucleic acid--.

In claim 19, line 3, replace "A" after "or" and before "plant" with --the--.

In claim 29, replace "corresponding non-transformed wild type plant" with --non-transformed wild type plant lacking said ORSRP coding nucleic acid--.

In claims 47 and 49, line 2, replace "encoding" after "ORSRP" and before "nucleic acid" with --coding--.

Claims 5, 18, 19, 32, 47 and 49 contain non-elected SEQ ID NOs. which must be deleted.

Appropriate action/corrections are required.

Double Patenting

The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. A nonstatutory obviousness-type double patenting rejection is appropriate where the conflicting claims are not identical, but at least one examined application claim is not patentably distinct from the reference claim(s) because the examined application claim is either anticipated by, or would have been obvious over, the reference claim(s). See, e.g., *In re Berg*, 140 F.3d 1428, 46 USPQ2d 1226 (Fed. Cir. 1998); *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) or 1.321(d) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent either is shown to be commonly owned with this application, or claims an invention made as a result of activities undertaken within the scope of a joint research agreement.

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

8. Claims 1, 5, 8-11, 13, 15, 18, 19, 29, 32, 47 and 49 are provisionally rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 2, 10, 11, 12, 15, 16, 19, 22, 23 and 24-27 of co-pending Application No. 11/251,208 ('208). Although the conflicting claims are not identical, they are not patentably distinct from each other because the transgenic plant cell or transgenic plant with increased tolerance to environmental stress, a method of producing said transgenic plant or a method of detecting said transgenic plant cell or plant as claimed by copending '208 involves the transformation of plant cells or plant with a nucleic acid sequence (SEQ ID NO: 51) which encodes the polypeptide of SEQ ID NO: 52 with stress tolerance activity. Instant SEQ ID NOs: 3 and 4 have 100% sequence identity to SEQ ID NOs: 51 and 52, respectively of copending '208. The stress-tolerant transgenic plant cell of claims 2, 24-25 and the stress-tolerant transgenic plant of claims 26-27 of copending '208 encompass the stress-tolerant transgenic plant cell and plant of instant claims 1, 5, 8-10, 11, 13 and 15. Likewise, instant claims 19 directed to an expression vector comprising an expression cassette comprising SEQ ID NO: 3 is encompassed by the claims 10 and 11 of copending '208. Instant claims 29 and 32 directed to a method of producing a transgenic plant with increased tolerance to environmental stress comprising expression of instant SEQ ID NO: 3 are encompassed by the method claims 15, 16 and 19 of copending '208 which also uses expression of a nucleic acid sequence which has 100% sequence identity to instant SEQ ID NO: 3. Instant claim 47 directed to a method for preparing a plant cell with increased environmental stress tolerance comprising transformation of instant SEQ ID NO: 3 is encompassed by the claim 47 of

compending '208. Furthermore, instant claim 49 directed to a method for selecting plants with increased environmental stress tolerance comprising using instant SEQ ID NO: 3 is encompassed by claims 22 and 23 of compending '208 which are directed to the method for detecting stress tolerance in plant cells or plant comprising using a nucleic acid sequence which has 100% sequence identity to instant SEQ ID NO: 3.

The property of heat-stable oxidoreductase stress-related protein activity is inherent to the polypeptide encoded by SEQ ID NO: 52 of compending '208, given that the method steps described by compending '208 do not differ from the instantly claimed method steps.

This is a provisional double patenting rejection because conflicting claims have not been patented.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

9. Claims 5, 18, 32, 47 and 49 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claims 5, 32, 47 and 49 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite in their recitation "homologs", which is confusing since it is unclear what is intended. The definition on pages 17-18 indicate "homologs" as similar nucleotide or amino acid sequences. "Similar" is a relative term, that has no definite meaning.

Claims 18 and 49 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite in their recitation “parts thereof”, which is confusing, since it is unclear which “parts” are encompassed? The metes and bounds are unclear. The recitation “parts” reads on a 2-mer of SEQ ID NO: 3 or a nucleic acid fragment comprising a randomized nucleotide sequence derived from SEQ ID NO: 3. It is unclear what is intended?

Claim 18 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite in its recitation “targeting sequences”, which is confusing since it is unclear which “targeting sequences” are being referred to? Are these signal sequence(s)?

Claim 47 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite because claim 47 is incomplete for omitting essential steps, such omission amounting to a gap between the steps. See MPEP § 2172.01. Claim 47 is missing the essential step of expressing the ORSRP coding nucleic acid. The last step only results in a plant cell comprising the ORSRP coding nucleic acid.

Claim 49 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite because claim 49 is incomplete for omitting essential steps, such omission amounting to a gap between the steps. See MPEP § 2172.01. Claim 49 is missing the essential step of selecting the plants with increased environmental stress tolerance. It is unclear how ORSRP coding nucleic acid of SEQ ID NO: 3 is utilized as DNA marker? It is also unclear what is intended?

Appropriate action/corrections are required.

Claim Rejections - 35 USC § 112

The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

10. Claims 1, 5, 8-11, 13, 15, 18-19, 29, 32, 47 and 49 are rejected under 35 U.S.C. 112, first paragraph first paragraph, because the specification, while being enabling for drought, salt or low temperature tolerant transgenic plant cell, plant or a method of making said transgenic plant cell or plant comprising transformation of said plant cell with an ORSRP coding nucleic acid sequence of SEQ ID NO: 3, does not reasonably provide enablement for a transgenic plant cell, plant or a method of making said transgenic plant comprising (a) homologs of SEQ ID NO: 3, (b) parts of SEQ ID NO: 3, (c) any ORSRP, and (d) tolerance to *any* environmental stress. The claims contain subject matter which was not described in the specification in such a way as to enable any person skilled in the art to which it pertains, with which it is most nearly connected, to make and use the invention commensurate in scope with these claims.

Claims are broadly drawn to an environmental stress-tolerant transgenic plant cell, plant or a method of making said transgenic plant cell or plant comprising transformation of said plant with a nucleic acid sequence encoding a oxidoreductase Stress-Related Protein (ORSRP).

The specification teaches transgenic *Arabidopsis* plants overexpressing a nucleic acid sequence of SEQ ID NO: 3 derived from yeast, and encoding the oxidoreductase Stress-Related Protein (ORSRP) of SEQ ID NO: 4. The transgenic plants exhibited

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increased drought tolerance compared to the non-transgenic plants lacking said nucleic acid sequence. See Example 1, pages 50-56.

Claims 5, 32, 47 and 49 are directed to a transgenic plant cell, plant or a method of making or preparing said plant cell or plant with increased environmental stress tolerance comprising homologs of SEQ ID NO: 3. Claims 18-19 are directed to a plant expression cassette comprising a part of SEQ ID NO: 3. Furthermore, claim 19 is also directed to a host cell comprising a part of SEQ ID NO: 3. Further, claim 49 is directed to a method for selecting plants with increased environmental stress tolerance comprising a part of SEQ ID NO: 3. This implies that claims encompass nucleic acid sequence(s) which are not 100% identical to SEQ ID NO: 3. This also implies that variants (homologs, parts) of SEQ ID NO: 3 would encompass sequences with deletion, addition or substitution of one or more nucleotides in SEQ ID NO: 3, or alterations of one or more amino acids in the encoded protein of SEQ ID NO: 4, except changes due to codon degeneracy. Specification provides guidance on a method of making drought tolerant transgenic plant using SEQ ID NO: 3 encoding SEQ ID NO: 4. Specification does not provide guidance on a method of using a nucleic acid sequence which is not 100% identical to SEQ ID NO: 3 to produce a transgenic plant cell or plant with increased environmental stress tolerance.

Keskin et al. (Protein Science, 13:1043-1055, 2004) teach that proteins with similar structure may have different functions. Thornton et al. (Nature structural Biology, structural genomics supplement, November 2000) teach that structural data may carry information about the biochemical function of the protein. Its biological role in the cell or organism is much more complex and actual experimentation is needed to elucidate

actual biological function under *in vivo* conditions. Furthermore, Guo et al. (PNAS, 101: 9205-9210, 2004) teach that there is a probability factor of 34% that a random amino acid replacement in a given protein will lead to its functional inactivation. In the instant case, such a probability factor will be much higher as proteins encoded by a homolog or part of SEQ ID NO: 3 would encompass more than a single amino acid changes in the encoded polypeptide, except changes due to codon degeneracy. Thus it would have been highly unpredictable at the time claimed invention was made to make use of homologs or parts of SEQ ID NO: 3, which have less than 100% sequence identity to SEQ ID NO: 3 in a method of producing an environmental stress tolerant transgenic plant. Undue experimentation would have been required at the time claimed invention was made to determine how to use homologs or parts of SEQ ID NO: 3 in a method of producing an environmental stress tolerant transgenic plant. Neither the state of art nor Applicant provide guidance as to how inoperable embodiments can be readily eliminated other than random trial and error. See Genentech, Inc. v. Novo Nordisk, A/S, USPQ2d 1001, 1005 (Fed. Cir. 1997), which teaches that "the specification, not the knowledge of one skilled in the art" must supply the enabling aspects of the invention.

Furthermore, claims 1, 19, 29, 47 and 49 are directed to a method of increasing plant cell or plant tolerance to *any* environmental stress comprising transforming said plant with an ORSRP coding nucleic acid of SEQ ID NO: 3. The specification provides guidance on increasing low temperature, salt or dehydration stress tolerance of a transgenic plant cell or plant expressing the nucleic acid sequence of SEQ ID NO: 3. However, specification does not provide guidance on increasing stress tolerance to said transgenic plant cell or plant under *any* type of environmental stress condition other

than low temperature, salt and dehydration stresses. In the absence of guidance, undue experimentation would have been required by a skilled artisan to determine how to use the instantly claimed transgenic plant cell or plant comprising SEQ ID NO: 3, in a method of increasing tolerance of said plant cell or plant to any type of environmental stress.

Claims 47 and 49 are rejected under 35 U.S.C. 112, first paragraph, as based on a disclosure which is not enabling. Product that is critical or essential to the practice of the invention, but not included in the claim is not enabled by the disclosure. See *In re Mayhew*, 527 F.2d 1229, 188 USPQ 356 (CCPA 1976). Claims 47 and 49 do not mention expressing any nucleic acid sequence encoding a product that confer increased stress resistance.

Claims 1 and 29 are directed to any ORSRP coding nucleic from any organism or species. While the specification teaches a nucleic acid sequence encoding SEQ ID NO: 3 encoding the ORSRP of SEQ ID NO:4, it does not enable all nucleic acid sequences encoding other ORSRPs. Undue experimentation would have been required by one skilled in art to isolate other ORSRP from other sources and use them in a method of obtaining stress-tolerant transgenic plant cell or plant. See *In re Bell*, 26 USPQ2d 1529, 1532 (Fed. Cir. 1993) and *In re Deuel*, 34 UPSQ2d, 1210 (Fed. Cir. 1995), which teach that the mere existence of a protein does not enable claims drawn to a nucleic acid encoding that protein. See also *Amgen Inc. v. Chugai Pharmaceutical Co. Ltd.*, 18 USPQ2d 1016 at page 1027, where it is taught that the disclosure of a few gene sequences did not enable claims broadly drawn to any analog thereof.

Given the breadth of the claims, unpredictability of the art and lack of guidance of the specification, as discussed above, undue experimentation would have been required by one skilled in the art to make and use of claimed invention.

11. Claims 1, 5, 8-11, 13, 15, 18-19, 29, 32, 47 and 49 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

Claims are broadly drawn to an environmental stress-tolerant transgenic plant cell, plant or a method of making said transgenic plant cell or plant comprising transformation of said plant with a nucleic acid sequence encoding a oxidoreductase Stress-Related Protein (ORSRP).

The specification describes transgenic *Arabidopsis* plants overexpressing a nucleic acid sequence of SEQ ID NO: 3 derived from yeast, and encoding the oxidoreductase Stress-Related Protein (ORSRP) of SEQ ID NO: 4. The transgenic plants exhibited increased drought tolerance compared to the non-transgenic plants lacking said nucleic acid sequence. See Example 1, pages 50-56.

Claims 5, 32 and 47 are directed to a transgenic plant cell, plant or a method of making or preparing said plant cell or plant with increased environmental stress tolerance comprising homologs of SEQ ID NO: 3. Claims 18-19 are directed to a plant expression cassette comprising a part of SEQ ID NO: 3. Furthermore, claim 19 is also directed to a host cell comprising a part of SEQ ID NO: 3. Further, claim 49 is directed

to a method for selecting plants with increased environmental stress tolerance comprising a part of SEQ ID NO: 3. This implies the claims encompass nucleic acid sequence(s) which are not 100% identical to SEQ ID NO: 3. This also implies that variants (homologs, parts) of SEQ ID NO: 3 would encompass sequences with deletion, addition or substitution of one or more nucleotides in SEQ ID NO: 3, or alterations of one or more amino acid in the encoded protein of SEQ ID NO: 4, except changes due to codon degeneracy. The specification does not have adequate written description for the genus of ORSRP coding nucleic acids, genus of SEQ ID NO: 3 homologs, and genus of SEQ ID NO: 3 parts, under current written description guidelines.

Specification does not describe undisclosed structures of Applicants broadly claimed genus, and one skilled in the art would not have reliably predicted the structure of Applicant's broadly claimed genus based on the disclosure of SEQ ID NOs: 3 and 4.

Furthermore, said structures of Applicant's broadly claimed genus are not correlated to the function of imparting stress tolerance in a transgenic plant.

Furthermore, Applicants have failed to describe conserved functional domains that are shared by Applicant's broadly claimed genus. The specification does not reduce to practice any modification of ORSRP coding sequence of SEQ ID NO: 3. Accordingly, one skilled in the art would not recognize from the disclosure that the applicant was in possession of the claimed genus.

Accordingly, there is lack of adequate description to inform a skilled artisan that applicant was in possession of the claimed invention at the time of filing. See Written Description guidelines published in Federal Register/Vol.66, No. 4/Friday, January 5, 2001/Notices; p. 1099-1111.

Given the claim breadth and lack of guidance as discussed above, the specification does not provide written description of the genus broadly claimed. Accordingly, one skilled in the art would not have recognized Applicants to have been in possession of the claimed invention at the time of filing.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

12. Claims 1, 5, 8-11, 13, 15, 18-19, 29, 32, 47 are rejected under 35 U.S.C. 102(b) as anticipated by Lanahan et al. (WIPO, PCT, WO 00/36126, Published 22 June 2000, Applicant's IDS).

Lanahan et al. disclose a plant expression cassette, an expression vector, transgenic plant cell, transgenic plant and a method of producing said transgenic plant cell or plant comprising introducing and expressing a nucleotide sequence encoding heat-stable thioredoxin protein, or wherein transgenic plant cell or plant is a monocotyledonous (maize) or a dicotyledonous (tomato) plant. The property of stress tolerance to an environmental stress is inherent to the method of making said transgenic plant comprising a nucleotide sequence encoding the thioredoxin protein taught in the reference. See abstract; pages 1-2, 6-7, 11-13, 17, 20-31; Examples 1-2.

This rejection is made because of the following reasons: a) heat stable thioredoxin in claims 1 and 29 read on any heat stable thioredoxin; b) homologs of SEQ

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ID NO: 3 read on any oxidoreductase protein, and c) parts of SEQ ID NO: 3 reads on any oxidoreductase protein encoded by a nucleic acid sequence which has 2 nucleotide sequence identity with SEQ ID NO: 3.

Accordingly, Lanahan et al. anticipate the claimed invention.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

13. Claims 1, 5, 8-11, 13, 15, 18-19, 29, 32, 47 and 49 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gan (Biochem. Biophys. Res. Comm., 187:949-955, 1992) in view of Valvekens et al. (PNAS, 85:5536-5540, 1998) and Grant et al. (Biochimica et Biophysica Acta, 1490:33-42, 2000).

Gan teach a nucleic acid sequence encoding yeast thioltransferase (also called glutaredoxin), wherein said nucleic acid sequence has 100% sequence identity with instant SEQ ID NO: 3 which encodes a yeast glutaredoxin protein of SEQ ID NO: 4. Furthermore instant SEQ ID NO: 4 has also 100% sequence identity to the amino acid sequence of glutaredoxin taught in the reference. The reference further teaches that glutaredoxin protein participates in the reduction of low molecular weight and protein disulfides in the presence of glutathione.

Gan et al. do not teach making a transgenic plant.

Valvekens et al. teach a method of transformation of plant cells and regeneration of transgenic plants expressing heterologous protein. See page 5536, column second through column 1 of page 5537; page 5538, Figures 3 and 4.

Grant et al. teach that yeast glutaredoxins are small heat-stable oxidoreductases which play an important role in protecting a cell exposed to environmental stresses. See, in particular, abstract, pages 33, 34; page 35, figure 1; page 36, figure 2; page 37, figure 3; page 38, figure 4; page 39, figure 5; pages 40-41.

It would have been obvious to one of the ordinary skill in the art to express nucleic acid sequence encoding glutaredoxin protein of Gan et al. in a plant using any plant transformation method including the one taught by Valvekens et al. Given that Grant et al. teach that glutaredoxin protein (same as taught by Gan et al.) are implicated in protecting a cell subjected to an environmental stress, one of ordinary skill in the art would have been motivated to express Gan et al. nucleic acid sequence encoding glutaredoxin protein in any eukaryotic host cell including a plant cell to produce a transgenic plant cell which is regenerated into a stress-tolerant transgenic plant with reasonable expectation of success. It would have been obvious to one of ordinary skill in the art to use Gan et al. nucleic acid encoding the glutaredoxin protein as a DNA marker in any DNA hybridization based technique, such as Southern blot or DNA dot blot analysis to identify stress-tolerant transgenic plant with reasonable expectation of success.

Thus, the claimed invention as a whole was prima facie obvious over the combined teachings of the prior art.

Conclusions

14. Claims 1, 5, 8-11, 13, 15, 18-19, 29, 32, 47 and 49 are rejected.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Vinod Kumar whose telephone number is (571) 272-4445. The examiner can normally be reached on 8.30 a.m. to 5.00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Anne Marie Grunberg can be reached on (571) 272-0975. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

DAVID H. KRUSE, PH.D.
PRIMARY EXAMINER

